

CLAIMS:

1 1. A method for directing packets from a first network to a second
 2 network, packets of said first network following a predetermined protocol
 3 employing global addressing, packets of said first network having a source
 4 identification code, a destination code, and a service code, said second network
 5 offering the benefit of one of a plurality of service classes, the method
 6 comprising the steps of:

7 extracting the source identification code and the service code from
 8 packets of the first network;

9 using the source identification code to lookup a corresponding code
 10 indicating permission with respect to the service classes; and

11 issuing packets onto the second network with the benefit of a permissible
 12 one of the service classes, the permissible one of the service classes being
 13 allocated consistent with the service code if the service code is consistent with
 14 the corresponding code.

1 2. Method in accordance with claim 1 employing a host and comprising
 2 the step of:

3 using the host to originate at least some of the packets and to set the
 4 source identification code, the destination code, and the service code for the
 5 packets produced by the host; and

6 sending the packets from the host on at least one hop based on the
 7 destination code.

1 3. Method in accordance with claim 2 wherein packets produced by the
 2 host are produced by software giving a user the ability to select the service
 3 code.

1 4. Method in accordance with claim 2 wherein packets produced by the

2 host are produced by software without the intervention of hardware dedicated
3 to setting the service code.

1 5. Method in accordance with claim 2 wherein packets sent from the
2 host make a plurality of hops with only once having the step performed of using
3 the source identification code to lookup a corresponding code.

1 6. Method in accordance with claim 2 wherein packets sent from the
2 host make a plurality of hops and arrive at a destination with only once having
3 the step performed of using the source identification code to lookup a
4 corresponding code.

1 7. Method in accordance with claim 2 wherein packets sent from the
2 host make a plurality of hops before the step of using the source identification
3 code to lookup a corresponding code.

1 8. Method in accordance with claim 1 employing an edge router for
2 transferring packets to the second network, said second network being adapted
3 to offer different types of quality of service, the step of issuing packets with
4 the benefit of a permissible one of the service classes being performed at the
5 edge router.

1 9. Method in accordance with claim 8 wherein the second network
2 operates under one of the ATM, MPLS, IP TOS, and Diffserv standards.

1 10. Method in accordance with claim 1 comprising the steps of:
2 extracting the destination code from packets of the first network; and
3 using the destination code to lookup a corresponding code indicating
4 permission with respect to the service classes.

1 11. Method in accordance with claim 10 wherein the step of using the
2 destination code is conducted to establish a permission code independently of
3 the source code.

1 12. Method in accordance with claim 10 wherein the step of using the
2 destination code is conducted if the service code signifies the destination code
3 is applicable.

1 13. Method in accordance with claim 1 employing a host and gateway,
2 comprising the steps of:

3 using the host to originate at least some of the packets and to set the
4 source identification code and the destination code;

5 using the gateway to set the service code for packets produced by the
6 host; and

7 sending packets reaching the gateway from the host on at least one hop
8 based on the destination code before the step of using the source identification
9 code to lookup a corresponding code.

1 14. Method in accordance with claim 13 wherein the step of using the
2 gateway to set the service code is performed by examining one or more of the
3 destination code, the source code, or information carried by the packet
4 indicating the type of data in the packet.

1 15. Method in accordance with claim 1 wherein the step of issuing
2 packets with the benefit of a permissible one of the service classes is performed
3 by allocating a defaulting one of the service classes if the service code is
4 inconsistent with the corresponding code.

1 16. Method in accordance with claim 1 wherein the source identification
2 code, the destination code, and the service code are located in a header defined

3 by the predetermined protocol, said predetermined protocol operating at a
4 network layer.

1 17. Method in accordance with claim 16 wherein the step of issuing
2 packets with the benefit of a permissible one of the service classes is performed
3 without reference to a layer above the network layer.

1 18. Method in accordance with claim 1 wherein the source identification
2 code is one of a plurality of source identification codes, and wherein the
3 corresponding code is one of a plurality of corresponding codes, the method
4 comprising the steps of:

5 correlating the source identification codes with the corresponding codes
6 and storing this correlation as entries in a service table, the step of issuing
7 packets with the benefit of a permissible one of the service classes being
8 performed by looking up the corresponding code in the service table by using
9 the source identification code.

1 19. Method in accordance with claim 18 wherein some of the entries in
2 the service table are indexed by a prefix of the source identification code in
3 order to indicate that all codes having the prefix have the same correlation to
4 the corresponding codes.

1 20. Method in accordance with claim 19 wherein the step of issuing
2 packets with the benefit of a permissible one of the service classes is performed
3 by looking up the corresponding code in the service table by referring to the
4 longest one of the prefixes that matches the source identification code.

1 21. Method in accordance with claim 19 employing an application
2 specific integrated circuit for performing lookups on the service table, the step
3 of issuing packets with the benefit of a permissible one of the service classes

being performed by looking up the corresponding code in the service table by referring to the longest one of the prefixes that matches the source identification code.

22. Method in accordance with claim 18 wherein each of the permission codes signify one or more of the service classes, so that authorization may be given for an individual one of the source identification codes to operate on one or another of the service classes.

23. Method in accordance with claim 1 wherein the predetermined protocol is the Internet Protocol and the service code is stored in a header in the Type of Service field.

24. Method in accordance with claim 1 wherein the predetermined protocol is the Internet Protocol and the service code is stored in a header in the IP Options field.

25. Method in accordance with claim 1 wherein the service code is encoded to signify a requested quality of service with respect to one or more of bandwidth, latency, jitter, reliability, and security.

26. Method in accordance with claim 1 wherein the service code is encoded to signify membership in a group entitled to a predetermined quality of service.

27. Method in accordance with claim 1 wherein the service code is encoded to signify a user application requiring a corresponding quality of service.

28. Method in accordance with claim 1 wherein the second network is

2 a backbone, the service code being encoded to signify a request to enter the
3 backbone.

1 29. Method in accordance with claim 28 wherein the service code
2 includes information on a requested channel within the backbone.

1 30. Method in accordance with claim 1 employing a plurality of access
2 nodes of one or more backbones, the service code being interpreted to signify
3 a selection of one of the access nodes.

1 31. Method in accordance with claim 1 comprising the step of:
2 calculating a usage charge by measuring the amount of usage of the step
3 of issuing packets with the benefit of a permissible one of the service classes.

1 32. Apparatus for directing packets from a first network to a second
2 network, packets of said first network following a predetermined protocol
3 employing global addressing, packets of said first network having a source
4 identification code, a destination code, and a service code, said second network
5 offering the benefit of one of a plurality of service classes, the apparatus
6 comprising:

7 an input device adapted to be coupled to said first network for extracting
8 from packets the source identification code and the service code;

9 a table coupled to said input device for using the source identification
10 code to lookup a corresponding code indicating permission with respect to the
11 service classes, a permissible one of the service classes being allocated
12 consistent with the service code if the service code is consistent with the
13 corresponding code; and

14 an output device adapted to be coupled to said second network, said
15 output device being in communication with said input device for issuing packets
16 with the benefit of the permissible one of the service classes.

1 33. Apparatus in accordance with claim 32 wherein the output device is
2 at the edge of the second network, said second network being adapted to offer
3 different types of quality of service, the output device being operable to route
4 packets to the second network with the benefit of one of the service classes.

1 34. Apparatus in accordance with claim 33 wherein the output device
2 produces an output under one of the ATM, MPLS, Diffserv, and IP TOS,
3 standards.

4 35. Apparatus in accordance with claim 32 wherein the output device
5 issues packets with the benefit of a defaulting one of the service classes if the
6 service code is inconsistent with the corresponding code.

1 36. Apparatus in accordance with claim 32 wherein the source identifica-
2 tion code, the destination code, and the service code are located in a header
3 defined by the predetermined protocol, said predetermined protocol operating
4 at a network layer, the apparatus being operable to allocate service classes by
5 obtaining information from the network layer.

1 37. Apparatus in accordance with claim 36 wherein the apparatus is
2 operable to issue packets from the output device without reference to a layer
3 above the network layer.

1 38. Apparatus in accordance with claim 32 wherein the source
2 identification code is one of a plurality of source identification codes, and
3 wherein the corresponding code is one of a plurality of corresponding codes, the
4 apparatus comprising:

5 a service table, the apparatus being operable to (a) correlate the source
6 identification codes with the corresponding codes and store this correlation as

entries in the service table, and (b) lookup the corresponding code in the service table by using the source identification code.

39. Apparatus in accordance with claim 38 wherein some of the entries in the service table are indexed by a prefix of the source identification code in order to indicate that all codes having the prefix have the same correlation to the corresponding codes.

40. Apparatus in accordance with claim 39 and operable to lookup the corresponding code in the service table by referring to the longest one of the prefixes that matches the source identification code.

41. Apparatus in accordance with claim 39 comprising:
an application specific integrated circuit for looking up the corresponding code in the service table by referring to the longest one of the prefixes that matches the source identification code.

42. Apparatus in accordance with claim 38 wherein each of the corresponding codes signify one or more of the service classes, so that authorization may be given for an individual one of the source identification codes to operate on one or another of the service classes.

43. Apparatus in accordance with claim 32 wherein the input device is operable with the predetermined protocol being the Internet Protocol and with the service code being stored in a header in the Type of Service field.

44. Apparatus in accordance with claim 32 wherein the input device is operable with the predetermined protocol being the Internet Protocol and the service code being stored in a header in the IP Options field.

1 45. Apparatus in accordance with claim 32 wherein the apparatus is
2 operable to respond to the service code by acting to arrange a predetermined
3 quality of service with respect to one or more of bandwidth, latency, jitter,
4 reliability, and security.

1 46. Apparatus in accordance with claim 32 wherein the service code may
2 be encoded to signify membership in a group entitled to a predetermined quality
3 of service, the apparatus being operable to arrange the predetermined quality
4 of service in response to the service code being encoded to signify membership
5 in the group.

1 47. Apparatus in accordance with claim 32 wherein the service code may
2 be encoded to signify a user application requiring a corresponding quality of
3 service, the apparatus being operable to arrange the corresponding quality of
4 service in response to the service code being encoded to signify the user
5 application.

1 48. Apparatus in accordance with claim 29 wherein said second network
2 is a backbone, the apparatus being operable to arrange for entry to the
3 backbone in response to the service code being encoded to signify a request to
4 enter the backbone.

1 49. Apparatus in accordance with claim 48 wherein the apparatus is
2 operable to arrange for entry on a selected channel of the backbone in response
3 to the service code being encoded to signify a request for the selected channel
4 within the backbone.

1 50. Apparatus in accordance with claim 32 and adapted to couple to a
2 plurality of access nodes of one or more backbones, the apparatus being
3 operable to arrange for entry at a selected one of the access nodes of one of

4 the backbones in response to the service code being encoded to signify a
5 request for the selected one of the access nodes.

1 51. Apparatus in accordance with claim 32 comprising:
2 means for calculating a usage charge by measuring the amount of usage
3 under the source identification code.

1 52. Apparatus in accordance with claim 32 wherein the input device has
2 a plurality of input ports and wherein the output device has a plurality of output
3 ports, the apparatus comprising:

4 a switching fabric coupled between said input device and said output
5 device for directing packets from selected ones of said input ports to selected
6 ones of said output ports; and

7 a processor coupled to said input device and said output device for
8 updating a routing table indicating how packets are to be routed between the
9 input ports and the output ports.

1 53. Apparatus for directing packets from a first network to a second
2 network, packets of said first network following a predetermined protocol
3 employing global addressing, packets of said first network having a source
4 identification code, a destination code, and a service code, said second network
5 offering the benefit of one of a plurality of service classes, the apparatus
6 comprising:

7 a host for (a) originating at least some of the packets and setting the
8 source identification code, the destination code, and the service code for the
9 packets, and (b) sending the packets from the host on at least one hop over the
10 first network consistent with the destination code; and

11 an edge router for receiving packets over the first network from the host
12 and for transferring the packets to the second network using different ones of
13 the service classes, the edge router comprising:

an input device adapted to be connected to the first network for extracting from packets the source identification code and the service code;

a table coupled to said input device for using the source identification code to lookup a corresponding code indicating permission with respect to the service classes, a permissible one of the service classes being allocated consistent with the service code if the service code is consistent with the corresponding code; and

an output device adapted to be connected to the second network, said output device being in communication with said input device for sending packets onto the second network with the benefit of the permissible one of the service classes.

54. Apparatus in accordance with claim 53 wherein packets produced by the host are produced by software giving a user the ability to select the service code.

55. Apparatus in accordance with claim 53 wherein packets produced by the host are produced by software without the intervention of hardware dedicated to setting the service code.

56. Apparatus for directing packets from a first network to a second network, packets of said first network following a predetermined protocol employing global addressing, packets of said first network having a source identification code, a destination code, and a service code, said second network offering the benefit of one of a plurality of service classes, the apparatus comprising:

a host for (a) originating at least some of the packets and setting the source identification code and the destination code for the packets, and (b) sending the packets from the host on at least one hop over the first network consistent with the destination code; and

11 a gateway coupled to the host over the first network for (a) setting the
12 service code for the packets produced by the host, and (b) sending the packets
13 reaching the gateway from the host on at least one hop over the first network
14 consistent with the destination code; and

15 an edge router coupled to said gateway over said first network for
16 transferring packets to the second network, the edge router comprising:

17 an input device adapted to be coupled to said first network for extracting
18 from packets the source identification code and the service code;

19 a table coupled to said input device for using the source identification
20 code to lookup a corresponding code indicating permission with respect to the
21 service classes, a permissible one of the service classes being allocated
22 consistent with the service code if the service code is consistent with the
23 corresponding code; and

24 an output device adapted to be coupled to said second network, said
25 output device being in communication with said input device for issuing packets
26 with the benefit of the permissible one of the service classes.

1 57. Apparatus in accordance with claim 56 wherein the gateway is
2 operable to examine one or more of the destination code, the source code, or
3 information carried by the packets indicating the type of data in the packet.

1 58. Apparatus for directing from a first network packets following a
2 predetermined protocol employing global addressing, packets of said first
3 network having a source identification code, a destination code, and a service
4 code, the apparatus comprising:

5 a second network offering the benefit of one or more service classes;

6 an edge router for transferring packets to the second network using
7 different ones of the service classes, the edge router comprising:

8 an input device adapted to be connected to the first network for
9 extracting from packets the source identification code and the service code;

10 a table coupled to said input device for using the source identification
11 code to lookup a corresponding code indicating permission with respect to the
12 service classes, a permissible one of the service classes being allocated
13 consistent with the service code if the service code is consistent with the
14 corresponding code; and

15 an output device adapted to be connected to the second network, said
16 output device being in communication with said input device for sending
17 packets onto the second network with the benefit of the permissible one of the
18 service classes.

1 59. A method for directing packets from a first network to a second
2 network, packets of said first network following a predetermined protocol
3 employing global addressing, packets of said first network having a source
4 identification code, a destination code, and a service code, said second network
5 offering the benefit of one of a plurality of service classes, the method
6 comprising the steps of:

7 extracting the destination code and the service code from packets of the
8 first network;

9 using the destination code to lookup a corresponding code indicating
10 permission with respect to the service classes; and

11 issuing packets onto the second network with the benefit of a permissible
12 one of the service classes, the permissible one of the service classes being
13 allocated consistent with the service code if the service code is consistent with
14 the corresponding code.

1 60. Method in accordance with claim 59 wherein the step of using the
2 destination code is conducted to establish a permission code independently of
3 the source code.

1 61. Method in accordance with claim 59 wherein the step of using the

- Revised: June 18, 2001